



British Guiana.

ADMINISTRATION REPORT

OF THE

DIRECTOR OF AGRICULTURE,

FOR THE YEAR

1928.

GEORGETOWN, DEMERARA:
PRINTERS TO THE GOVERNMENT OF BRITISH GUIANA:
"THE ARGOSY" COMPANY, LIMITED,

1929.

DEPARTMENT OF AGRICULTURE.

HEAD OFFICE.

Director of Agriculture	...	...Prof. the Hon. J. Sydney Dash, B.S.A.
Deputy Director	...	...Vacant.
Senior Clerk	...	...J. F. Irving, M.C.
Accountant	...	...J. A. V. Bourne.
Clerks	...	...J. Pestano, O. Bardon, D. Terrill.

ENTOMOLOGY.

Entomologist	...	...L. D. Cleare, jnr., F.L.S., F.E.S.
Laboratory Assistant	...	...C. Williams.

BOTANY AND MYCOLOGY.

Botanist and Mycologist	...	...E. B. Martyn, B.A., (Oxon.)
Laboratory AssistantN. Persaud.

CHEMISTRY.

Scientific AssistantC. L. C. Bourne.
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VETERINARY.

Veterinary SurgeonT. Bone, O.B.E., M.R.C.V.S.
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BOTANIC GARDENS.

Assistant SuperintendentA. A. Abraham.
Meteorological ObserverD. D. Blackman.
Clerk	...	...G. L. Leitch.

AGRICULTURAL STATIONS.

Agricultural Superintendents—		
Demerara	...	...E. M. Peterkin.
North West District	...	...Edgar Beckett, F.L.S.
Essequibo	...	...Vacant.
Assistant Superintendent—		
Demerara	...	...H. D. Huggins, D.I.C.T.A.
Agricultural Assistants		...Indrobehary, H. B. France.
Resident Instructors		{ E. M. Morgan.
		{ C. C. Dowding.
		{ H. A. Cole.
Assistant Instructors		{ J. E. Wilson, J. M. Cush.
		{ R. R. Pasea, R. R. Ross.
		{ D. D. Haynes, D. W. Fingal.

SUGAR EXPERIMENT STATIONS.

COMMITTEE.

Director of Agriculture, Chairman, <i>ex officio</i> .		
Mr. R. Strang	...Pln. Uitvlugt	} Representing the British Guiana Sugar Planters' Association.
" G. E. Anderson	...Pln. Diamond, E.B.	
" A. E. Craig	...Pln. Ogle, E.C.	
" J. C. Gibson	...Pln. Port Mourant	
" C. Farrar...	...New Amsterdam	
Hon. R. E. Brassington	...Georgetown	

STAFF.

SOPHIA STATION, DEMERARA.

Agronomist	...	...Vacant.
Field Manager	...	...C. Cameron.
Laboratory Assistant	...	...L. A. Robinson.

In collaboration with the Officers of the Department of Agriculture.

C.S.O. No. 2209/29.



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REPORT ON THE DEPARTMENT OF AGRICULTURE FOR THE YEAR
1928.

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REPORT ON THE DEPARTMENT OF AGRICULTURE FOR THE YEAR 1928.

I have the honour to submit the report of the Department of Agriculture for the year 1928.

2. This is the first complete record of the new Department which came into existence at the beginning of 1928. Reference to the Report of the Department of Science and Agriculture 1927, and the Agricultural Journal, Volume I.—No. 1, will indicate generally the lines along which re-organisation has been carried out.

3. It is proposed in future to publish an annual administrative report embodying the main features of departmental work and progress in agricultural activities for the year under review, leaving the detailed reports of the various divisions for publication in the Agricultural Journal, or as separates, if necessity demands and funds permit. The change of system will result in economy with no loss of efficiency from a record point of view.

STAFF.

4. The re-organisation of the Department took effect from January 1, 1928, and a separate Government Analyst's Department was established.

Mr. E. M. Peterkin, Agricultural Superintendent, Demerara, had leave of absence out of the Colony from February 10 to February 29.

Mr. H. D. Huggins, Diplomat of the Imperial College of Tropical Agriculture, who had been employed for the past two years at the Sophia Experiment Station, was on February 1 appointed on probation to the post of Assistant Agricultural Superintendent attached to the Agricultural Station at Georgetown. His duties included those of Agricultural Officer for West Demerara.

Mr. J. A. V. Bourne, Accountant, who went on leave to Barbados on September 30, 1927, returned on February 13.

Mr. R. A. Alston, Assistant Botanist and Mycologist, resigned on April 12 to take up the appointment of Assistant Mycologist, Federated Malay States.

Mr. A. A. Abraham, Assistant Superintendent, Botanic Gardens, was absent on duty in Trinidad from May 10 to 27, where, through the courtesy of the Honourable W. G. Freeman, Director of Agriculture, and the staff of the Trinidad Department, he was able to study nursery methods in that Colony with special reference to citrus propagation.

Miss A. Jardim, Sixth Class Clerk, resigned her post on May 30.

Major T. Bone, O.B.E., M.R.C.V.S., arrived in the Colony on September 19 and assumed his duties as Government Veterinary Surgeon on that date.

Mr. E. B. Martyn, B.A., Botanist and Mycologist, arrived in the Colony on October 17 and assumed his duties on the following date.

Mr. W. H. Matthews, Agricultural Instructor, retired on pension from ill-health on December 31.

Professor the Honourable J. Sydney Dash, B.S.A., Director of Agriculture, was on leave of absence from the Colony from November 22 to December 19.

Mr. L. D. Cleare, F.L.S., F.E.S., Government Entomologist, acted as Director of Agriculture during the absence of Professor Dash.

5. Several posts were unfilled during the whole or greater part of the year, notably, those of Deputy Director, Botanist and Mycologist, and Government Veterinary Surgeon.

EXPENDITURE.

6. The total vote assigned to the Department by the Legislature at its session in January, 1928, for the year 1928 was \$92,126. The following additions were voted on Supplementary Estimates during the year 1928.

\$360 00—Agricultural Superintendent, Demerara.

\$147 00—Expenses of Mr. A. A. Abraham's visit to St. Clair Experiment Station, Trinidad.

\$150 00—Purchase of Tent Boat for Pomeroon Station.

\$333 60—Passage of Major T. Bone, Government Veterinary Surgeon, and wife.

\$168 00—Passage of Mr. E. B. Martyn, Botanist to the Colony.

7. The total of the estimate was therefore \$93,284.60. Of this amount, there was at December 31, 1928, an unexpended balance of \$6,966.42, as shown in the following table :—

TABLE I.
ANNUAL ESTIMATES.

No. of Sub-vote.	Sub-vote.	Balances Unexpended.	Excess Expenditure.
1-22	Personal Emoluments—Fixed and Unfixed	\$ 4,348 90	
	OTHER CHARGES.		
23-24	Travelling Expenses	434 90	
25	Library and Publications	...	\$ 95 28
26-31	General Expenses	...	154 05
32	Botany	2 69	
33	Meteorology	5 14	
34	Entomology	1 35	
35	Agricultural Chemistry	1 78	
36, 37-55	Botanic Gardens	18 86	
38	Other Government Gardens and Grounds	76 97	
39	Berbice Public Gardens	66	
40	Purchase, Production and Distribution of Seeds and Plants	3 15	
41	Experiment Station—Rice and other Products	...	227 24
42	North West Station	244 36	
43	Pomeroon Station	19 20	
44 & 46	Live Stock—Purchase and Maintenance of	122 90	
45	Cutting Grass for Police Horses	3 03	
47	Grants-in-aid for Exhibitions, &c.	1,098 97	
48	Subsidies to Agricultural Instructors	35 00	
49	Agricultural Apprentices	119 10	
50	Veterinary Preventive Measures	17 37	
51	Plant Pest Preventive Measures	5 56	
52	Contingencies	172 90	
53	Station at Golden Grove	18 70	
54	Purchase of Portable Typewriter	20 00	
56	Converting Public Gardens into Lawns	660 00	
57	Expenses, A. A. Abraham's visit to Trinidad	30	
58	Passage of Major T. Bone, Government Veterinary Surgeon and Wife	...	
59	Passage of E. B. Martyn, Botanist	1 20	
60	Purchase of Tent Boat for Pomeroon Station	10 00	
	TOTAL	\$ 7,442 99	\$ 476 57

8. The payments into the Treasury during the year were as follows :

Agricultural Stations	...	\$2,172 16
Botanical Gardens, Economic and Ornamental Plants	...	692 14
Sale of Official Publications	...	98 59
		<u>\$2,962 89</u>

This represents an increase of \$1,127.31 over the receipts for the previous year.

METEOROLOGY.

9. The following are abstracts of the Meteorological observations recorded at the Botanic Gardens, Georgetown, and at the Penal Settlement, Mazaruni, during 1928 :

Meridian of longitude for calculation of time adopted			
as standard in the Colony	...	...	60° W.
Hours slow of Greenwich time	...	...	3.45

Georgetown.

10. The meteorological station is situated in the Botanic Gardens, at a distance of 1.45 miles south of the coastline. The hours of observation are 7 a.m., and 1 and 6 p.m., local official time which is 3 hours and 45 minutes behind Greenwich time. The height of the barometer is 6 feet 6 inches above mean sea level.

11. During the year 1928, the mean air temperature in the shade for the months of January and February was lower than the means recorded over the period 1846-1927. The highest temperature recorded was 90.0° F. on October 14, while the lowest was 70.0° F. on the night of January 12. The mean shade temperature for the year was 80.8° F. or 0.4° F. above the average from 1846 to 1927. The total rainfall was 96.48 inches, as compared with 118.63 inches in the year 1927, and with 90.80 inches for the period 1880-1927. The total rainfall from January to April inclusive was 34.19 inches, as compared with 31.48 inches for the same period in 1927. Heavy rains were experienced in the months of January, May and June. For the months of July to December inclusive, the total rainfall was 31.89 inches or 8.43 inches below normal. The evaporation from a free water surface, a six feet square tank, at the ground level was 58.23 inches as compared with a normal evaporation of 57.90 inches; the evaporation for 1928 being 60.35% of the total rainfall. The total amount of bright sunshine for the year was 2,461.6 hours as compared with 2,364.5 hours in 1927 and with 2,678.6 hours in 1926 and was 2.6 hours above the average 1846-1927. The mean radiation temperature (blackened bulb in vacuo) was 4.5° higher than normal and 2.1° lower than that of the previous year, the maximum monthly record during the year being 150.5° for October, while the highest daily record 160.0° occurred on February 27.

The mean minimum temperature recorded at night on grass was 1.5° higher than the average. The mean velocity of the wind was 7.11 miles per hour, the maximum velocity being 15.00 miles per hour.

Mazaruni.

12. A sub-station established at the Penal Settlement, Mazaruni River, is in longitude 58° 38' 45" W. and latitude 6° 23' 35" N. at a distance of 42 miles south of the coastline. The hours of observation are the same as at the main station in Georgetown. The height of the barometer is 55 feet above mean sea level.

13. During 1928 the mean air temperature in the shade was 78.1° F; the maximum temperature recorded being 90.0° on October 13, while the minimum, 69.0° occurred on the 9th January, 13th March, 4th and 6th December. The total rainfall was 96.53 inches or 11.97 inches lower than that of the previous year. For the months of April, May, June, July, September October and November, the rainfall was 3.76, 3.10, 0.53, 0.17, 0.11, 3.71 and 0.71 inches above that at Georgetown for the same months. The total rainfall for the year was 0.05 inch higher than that at Georgetown. Rain fell on 208 days in the year as compared with 202 days in Georgetown. The total amount of bright sunshine recorded during the year was 1,832.8 hours as compared with 2,461.6 hours at Georgetown.

PRINCIPAL CROPS.

14. Agriculturally, the year 1928 may be regarded as a successful one from the point of view of production, there being marked increases in all the more important industries. Values, however, did not come up to expectations.

Sugar.

15. The total area in sugar cultivation in the Colony during the year 1928 was 57,625 English acres as against 59,271 acres for 1927. The yield was equivalent to over 2 tons per acre, the area reaped, as shown by the census returns being 53,489 acres yielding 116,484 tons sugar, the highest production since 1915; while the export was 114,687 tons as against the figures for 1927 of 114,632 tons produced from 53,230 acres, with an export for that year of 109,616 tons. The rum produced was 1,745,293 gallons of which 1,269,923 gallons were exported, as against an export of 1,081,120 gallons in 1927. The export of molasses was 2,873,468 gallons, an increase of 196,011 gallons over that of the previous year. With regard to cattle food, 2,082 tons of molascuit as against 977 tons for 1927 were exported. As in previous years the variety of sugar cane mostly grown in the Colony is D. 625; there are also small areas of B.H. 10 (12), Diamond 10, Diamond 37, Diamond 581, B. 208, D. 118, D. 145, Ba. 6032, D. 109, D. 419, R.P. 8 and Bourbon.

16. The following table shows the average acreage and exports under this crop from 1879 to 1922, with actual exports and values for the past six years. It is interesting to note that while the area under cultivation has considerably decreased in recent years, production has been steadily maintained culminating in the highest export since the record year of 1915 when 116,224 tons were exported.

17. Unfortunately poor prices prevailed; nevertheless, the general fact emerges that the industry is being efficiently carried on.

TABLE II.

Periods.	SUGAR-CANE.		SUGAR.	Value in dollars.
	No. of Acres (British) under cultivation.		Tons of Sugar exported.	
1879-1883	...	Av. 5 yrs. 81,270	103,860	...
1884-1888	...	" 80,690	113,820	...
1889-1893	...	" 79,630	110,900	...
1894-1898	...	" 70,640	101,620	...
1899-1903	...	" 74,170	106,260	...
1904-1908	...	" 75,580	110,830	...
1909-1913	...	" 72,640	94,820	...
1914-1918	...	" 76,672	106,980	...
1919-1922	...	" 65,020	89,782	...
1923	...	57,814	83,166	10,237,450
1924	...	67,190	85,896	8,482,200
1925	...	57,500	97,728	6,785,740
1926	...	58,589	84,659	6,050,257
1927	...	59,271	109,616	8,787,585
1928	...	57,625	114,687	8,124,666

Rice.

18. The area occupied by this cereal during 1928 was 44,359 acres but including the second crop the area actually reaped was 55,560 acres. The yield was returned as 978,315 bags of 140 lbs. padi, equivalent to a yield of 17.6 bags padi per acre.

19. The amount of rice exported was 18,083 tons with a value of \$1,114,147 as against 11,497 tons with a value of \$723,871 for 1927. The production and export of rice for 1928 was the highest since the inception of this industry, and shows in no uncertain terms the suitability of the Colony for rice production. Unfortunately, lower prices were obtained as compared with prices in the boom year of 1917 when 14,367 tons were exported with a value of \$1,422,805.

20. The response of the growers and those interested in the industry to the Department's efforts towards improving the cultivation and types grown has been one of the outstanding features of the period under review.

21. The following table gives particulars of rice production and values for the past six years:—

TABLE III.

Period.	Mean Rainfall Coastal Stations Calendar Year.	Areas under rice cultivation. British Acres reaped.				Yields of British Guiana.				
		Berbice.	Demerara.	Essequibe.		British Guiana total acreage (reaped).	Padi tons.	Rice, tons (50% yield of cleaned Rice from Padi)	Rice.	
				Mainland	Islands				Tons exported	Value in dollars
1923	80.9	16,460	10,824	7,010	4,421	38,715	33,270	19,962	3,971	273,687
1924	83.54	17,196	10,978	7,383	4,715	40,272	42,100	25,260	4,470	312,567
1925	63.25	16,524	10,093	8,655	4,618	39,890	38,403	23,042	6,918	523,964
1926	74.76	23,871	10,920	9,351	5,303	49,445	49,899	29,939	2,914	218,146
1927	118.63	19,184	13,788	12,585	4,870	50,427	59,748	35,848	11,497	723,871
1928	96.43	20,938	17,002	11,744	5,876	55,560	61,144	36,686	18,083	1,114,147

Coconuts.

22. The area under coconut palms in 1928, according to figures furnished the Department was 28,000 acres.

23. The yields were stated to have been 25,000,000 nuts, 8,000,000, lbs. copra and 52,219 gallons oil but reliable returns as to produce are not available. The exports for 1928 were as follows:—coconuts—322,000, valued at \$5,944; coconut oil—26,244 gallons, valued at \$26,206; and copra—70,017 cwts, valued at \$352,532. The figures for 1927 being: coconuts—334,000, valued at \$6,015; coconut oil—25,326 gallons valued at \$25,326; and copra—23,266 cwts, valued at \$116,525.

24. The industry is still a neglected one from an agricultural point of view, little care being taken in the establishment of new plantings and the maintenance of old; the result is that although the acreage and production are showing remarkable expansion, the actual yields per acre are low compared with other countries. The preparation of peasant copra leaves much to be desired.

TABLE IV.

COCONUTS, COPRA AND COCONUT OIL.

Periods.	No. of Acres (British) under cultivation.	No. Exported to nearest hundred.	Value in Dollars.	Copra, lbs.	Value in Dollars.	Coconut Oil, gallons.	Value in Dollars.
1909-1913	12,460	1,034,200	...	113,400	...	7,500	...
1914-1918	21,014	1,807,500	...	214,360	...	23,060	...
1919-1922	25,573	2,970,000	...	289,800	...	20,240	...
1923	22,970	2,659,000	...	941,000	...	26,621	...
1924	25,201	1,559,800	24,413	1,848,896	71,495	21,804	17,443
1925	29,879	1,363,280	34,293	1,935,110	96,110	30,394	30,394
1926	26,502	816,000	13,727	3,820,432	190,055	18,778	18,590
1927	27,790	334,000	6,015	2,605,818	116,525	25,326	25,326
1928	28,000	322,000	5,944	7,841,904	352,522	26,244	26,206

Coffee.

25. The acreage under this product during 1928, according to figures furnished the Department is 5,894 acres. Most of the coffee is Liberian and is grown on the pegass lands of the Pomeroon, the North West District and Nos. 1 and 2 Canals Polder District. These pegass areas are particularly suited to Liberian coffee and the crop can be cheaply produced, although a shortage of labour for reaping is frequently experienced. The exports were 918,772 lbs. valued at \$137,933 as against 430,543 lbs. valued at \$68,844 in 1927. Faulty pulping and drying of the produce is a serious drawback, but efforts to improve this are not entirely lacking and must be undertaken systematically, on a larger scale, if the industry—for which there is abundant room—is to thrive and develop on sound economic lines.

TABLE V.

Periods.	No. of Acres (British) under Cultivation.	Coffee Exported, lbs.	Value in Dollars.
1909-1913	2,660	115,200	
1914-1918	4,713	342,190	
1919	5,125	936,540	
1920	5,032	407,900	
1921	5,030	405,104	
1922	4,240	808,640	
1923	3,916	535,136	
1924	5,765	513,115	56,075
1925	6,243	668,029	114,593
1926	5,226	773,257	132,623
1927	5,272	430,543	68,844
1928	5,894	919,772	137,933

Para Rubber and Balata.

26. The area returned under Para rubber is 1,600 acres. The actual area is much greater than this but owing to the low price of rubber and the presence of the endemic leaf disease large areas are no longer considered in the returns. The export for 1928 was 143 cwts. valued at \$4,276 as against 356 cwts. valued at \$10,844 in 1927.

27. The export of balata (*Mimusops globosa*), was 5,782 cwts. valued at \$257,448 as against 6,698 cwts. valued at \$392,509 in 1927. This is still far below the average for 1907-25 which was 10,547 cwts.

MINOR INDUSTRIES.

28. *Cacao*.—There have been no exports of cacao for a number of years. Witch Broom, Pod Rot, overshadowing, inadequate drainage and general neglect have in most cases combined to defeat cacao cultivation. Its future as an industry appears very uncertain. The small quantity produced is used locally. The area is returned at 1,202 acres. The following table gives particulars of this industry:—

TABLE VI.

Periods.	No. of Acres (British) under cultivation.	Cacao exported, lbs.	Raw Cacao and prepared Cacao imported, lbs.
1904-1908	1,940	73,100	20,590
1909-1913	2,140	54,500	20,970
1914-1918	2,114	34,670	54,020
1919	2,147	9,520	102,580
1920-1922	2,020	(1920) 24,192	(1920) 179,120
1923	1,903	n ne	189,063
1924	1,918	"	188,373
1925	1,918	"	218,306
1926	1,287	"	174,085
1927	1,256	"	166,539
1928	1,202	"	153,760

29.—*Limes*.—The area under limes is returned at 660 acres, practically the same as that of 1927. The export for the year was 8,124 gallons of concentrated juice representing about 80,000 gallons of raw juice, valued at \$7,800, and 440 gallons of distilled oil of limes. The figures for 1927 were: concentrated juice—5,294 gallons, valued at \$7,623, and distilled oil of limes—273 gallons.

30. There are two factories operating, that of Messrs. S. Davson & Co., Ltd., Berbice, and a small Government factory at the Industrial School, Onderneeming.

31. Lime and other citrus fruit cultivation have received some stimulus as a result of increased departmental activity in the North West District where conditions on certain of the hill lands appear to favour their extension.

32. *Ground Provisions*.—Plantains, bananas, cassava and ground provisions are said to occupy 15,528 acres, an increase of 1,673 acres over that of 1927. Floods and droughts, coupled with difficulties of surplus disposal, have retarded the progress of these crops which have steadily fallen in acreage since 1918 when 21,959 acres were under cultivation.

33. Further, no agricultural system prevails on the majority of the so-called provision farms. The farmer usually lives some miles away, keeps no live stock for manure and the cultivation receives the minimum amount of attention with the result that yields are becoming unremunerative on old lands. The utilisation of peas and beans for soil improvement under such conditions and as profitable cash crops has been hitherto almost entirely neglected in spite of a good local demand. These provision farms are usually depressing places, especially so after stray cattle have raided them, as they frequently do in some districts.

34. *Ground-nuts*.—The interest exhibited by small cultivators in this crop during the year was on the whole of a rather disappointing nature. The experiments at Cecilia clearly indicated that as a peasant industry under sand-reef conditions it possessed possibilities and steps were taken to supply seed. It was emphasised that 500 acres were required to meet the local demand.

35. The Department, of course, from the outset recognised that as a plantation crop it could not be recommended, nor on clay soils would the culture be expected to succeed.

36. *Onions and Tomatoes*.—Interest was taken in these crops on a small scale by farmers on the coastlands, but owing to the drought experienced in the latter part of the year the results were not as successful as anticipated. Efforts to establish onions in the North West District, however, gave promising results while splendid yields of onions were obtained at the Cecilia Station, East Coast, on sandy soil where the crop attracted a great deal of notice.

37. In certain districts on the upper Corentyne coast tomatoes are usually grown in considerable quantities for local consumption and fetch fairly remunerative prices. The quality, however, is poor, as farmers in spite of advice to the contrary, persist in using local seed every year with the result that a degenerate type of tomato is being produced. It is expected that the cultivation of onions and tomatoes will gradually increase, first to supply local demands and later for export on a limited scale.

38. *Tobacco*.—This cultivation is gradually, if slowly, being extended for local consumption, especially of the heavy types.

CENSUS RETURNS.

39. The following tables show the number of acres under cultivation in 1928 in the three counties of the Colony and also summaries for the past 11 years :—

TABLE VII.

Counties.	Nature of Crops and number of Acres at 31st December, 1928.							
	Canes.	Rice.	Coconuts.	Cacao.	Coffee.	Rubber.	Limes.	Ground Provisions.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Berbice	19,761	20,938	6,922	166	200	225	400	4,430
Demerara	35,406	12,891	14,078	673	3,000	1,023	60	8,000
Essequibo	2,458	10,530	7,001	363	2,694	352	200	3,098
Total	57,625	44,359	28,000	1,202	5,894	1,600	660	15,528

TABLE VIII.

		Annual Summaries of the Acreages under cultivation during the years 1913, 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927 and 1928.								
	Year.	Sugar Cane.	Rice.	Coconuts.	Cacao.	Coffee.	Rubber.	Limes.	Maize, Plantains, etc., and Ground Provisions.	Total area under cultivation.
British Guiana	1913	72,635	33,889	14,177	1,863	3,166	4,018	941	17,580	148,319
do	1918	73,565	60,432	25,882	1,997	5,158	3,981	1,351	21,959	194,325
do	1919	70,876	61,400	25,882	2,147	5,125	4,042	1,335	18,192	188,999
do	1920	69,532	55,246	24,453	1,816	5,052	2,813	1,058	16,583	176,853
do	1921	63,420	55,911	26,321	1,176	5,030	2,813	1,102	16,378	172,151
do	1922	60,761	49,073	26,603	1,371	4,241	2,333	660	12,930	157,772
do	1923	57,814	34,965	22,970	1,903	4,096	2,080	800	11,924	136,552
do	1924	57,190	29,406	25,201	1,918	5,765	1,655	711	14,444	136,290
do	1925	57,600	29,333	29,979	1,918	6,243	2,200	655	11,715	139,543
do	1926	58,589	32,798	26,502	1,287	5,226	2,000	490	14,509	141,401
do	1927	59,271	37,340	27,790	1,356	5,272	1,800	669	13,855	147,353
do	1928	57,625	44,359	28,000	1,202	5,894	1,600	660	15,528	154,868

AGRICULTURAL INVESTIGATIONS.

40. With the changes in the Department, a special effort has been made to inaugurate experimental work on a larger and more systematic basis. This was imperative if reliable data were to be obtained on the suitability and value of existing crops, and of others, for commercial development. Indeed it must be evident that the success of Colonisation and Land Settlement Schemes, not to speak of the needs of those already settled on the land, must depend on careful field investigations. For convenience, the work will be dealt with under the various stations which are being organised.

Sugar Experiment Station, Sophia.

41. During the year under review, the Sugar Planters' Experiment Station was re-organised and control definitely placed under the Director of Agriculture with whom is associated a strong committee representing the British Guiana Sugar Planters' Association. Funds for the maintenance of this Station were provided, as in the past, by the Sugar Planters. Under the new arrangement, the field staff collaborate closely with the scientific officers of the Department on cane investigations.

42. The work for the year 1928 has consisted mainly in the cleaning and re-conditioning of the fields at the station, the re-arrangement of the variety plots and further extension of the existing work on cane varieties. In addition, a new mill room to house the experimental plant has been erected and laboratory and office buildings completely overhauled and renovated.

43. A certain amount of planting material was distributed to sugar estates during the year and in addition a large number of new varieties propagated at the station itself. Two new varieties have been introduced from Trinidad, viz., P.O.J. 2725 and P.O.J. 2878. These varieties have been kept under quarantine and show promise of being useful acquisitions.

44. The staff of the station suffered considerable depletion during the year, but provision is being made for the appointment of an Agronomist from January next and the inauguration of additional investigations on manures, cover crops, etc.

Agricultural Stations, Demerara County.

45. The following is a summary of the work carried on with various crops which were under investigation at Georgetown and at sub-station Cecilia, East Coast, as abstracted from the report of the Agricultural Superintendent.

46. *Rice*.—The more important lines of investigation related to (1) Variety trials; (2) Seed selection; (3) Rates of seeding; (4) Cultural methods.

47. The bulk of the work under the first consisted in purifying the existing varieties at the Station and the introduction of others. The old varieties at the Station were so badly mixed that roguing had to be undertaken on a large scale before accurate yield tests could be carried out. Data in respect to comparative yields will therefore not be available until 1929. The varieties cultivated in the Experimental Fields for many years include Demerara Creole, Nos. 75, 76, 77, 78, 79, H.6, H.7, Berbice Creole, Surinam Creole, McKenzie, and Blue Rose. To these a number obtained locally was added during the year, including Hope Barley and Essequibo Blue Stick. Contributions were also received from Trinidad, India, Burma, Honduras, Canada, Hawaii, Ceylon and California. Thus at the end of the year, the Station was in possession of a large and comprehensive collection of rices of varying types and showing distinctive characters as regards crop duration, yield, size and shape of grain, height of straw, milling qualities, etc.

48. Seed selection in addition to roguing out undesirables from seed plots consists fundamentally in the careful selection of individual plants exhibiting apparent superior characters and the comparative testing of their progeny, leading eventually to the isolation of improved strains within varieties and their multiplication for distribution to growers. This work entails the most careful nursery lay-out for a crop such as rice in order that no mixing may take place in letting in or taking off water. A special system had therefore to be devised to meet this requirement. In this way, an original selection of 315 individual plants from the autumn crop of 1927 have been dealt with, and further selections made during the spring and autumn crops of 1928. During the progress of this work opportunity has been taken to make accurate observations on habits of growth, tillering, stiffness of straw, resistance to varying conditions of environment, etc.

49. Rates of seeding experiments have so far proved conclusively that the amount of seed used per acre locally can almost be halved, resulting in better seedlings being produced in the nursery with improved field yields. A nursery seed rate of 7 lbs. to the square rod (12' 4" x 12' 4") can be confidently recommended and at this rate 35 lbs. of seed will be ample to plant an acre of rice, two or three plants being put to each hole when transplanting. Using a small number of robust seedlings induces increased tillering which results *inter alia* in heavier returns. These experiments are being continued while other related factors will be studied at the same time.

50. Cultural methods with the crop have included observations on the effect of more thorough cultivation and puddling to suppress undesirable volunteer rice (principally "red" and "bearded" sorts). In this connexion, the beneficial effect of complete flooding for some time of beds badly infested with inferior rices from previous crops, prior to planting the new crop, has been most marked. Light animal-drawn implements for rice work are also being investigated.

51. *Bananas*.—The various types found in the Colony are being collected as opportunity offers with a view to identification. Special attention is being given to finding out to what extent the true Gros Michel exists in various districts. The area is being gradually increased as suckers are available, while those already established are making excellent progress.

52. *Ground-nuts*.—At the conclusion of the experiments on ground-nuts which had been initiated by Sir C. H. Rodwell at Cecilia Sub-station, results from which were given in the Agricultural Journal for June, 1928, experiments with this crop were continued and included in addition to the better known sorts of the confectionery type such as Virginia Bunch and Virginia Runner, certain oil-yielding varieties obtained through Mr. Sampson of Kew. It is too soon to say what the value of these new introductions will be. In the meantime, for supplying the local trade, Virginia Bunch is undoubtedly the variety best suited to our conditions.

53. *Tobacco*.—A full account of the investigations and results obtained with tobacco at Sub-Station Cecilia were recorded in the *Agricultural Journal*, Volume I, No. 2, for June, 1928, and it is not proposed to review them here. Local interest is developing in the crop and seed is being supplied to persons who apply.

54. *Pine-apples*.—A collection of these (about 1,150 plants) obtained from local sources with a number added from Trinidad, has been established on the sand-reef at Cecilia and is making satisfactory progress. The relative values of the different varieties will be studied and the better sorts extended.

55. *Vegetable Crops*.—Trials have been initiated with the principal vegetable crops both at Georgetown and Cecilia. Promising results have been obtained with Onions, Tomatoes, Cabbage and Beet. Onions on the light soil at Cecilia yielded at the rate of 24,550 lbs. per acre green weight. Careful observations are being made on the behaviour of the many varieties of these crops tested and this information is available to market gardeners and others.

56. *Legumes*.—The more important legumes under trial have included Soya Beans, a difficult crop under strictly tropical conditions. Results so far have not been unfavourable and a satisfactory report was received on a sample sent the Imperial Institute. Peas and Beans for local consumption have also received attention, while results with leguminous cover crops such as Bengal Bean, *Crotalaria* spp. and others indicate that these are worthy of serious consideration in general agricultural practice.

57. *Miscellaneous*.—A number of other crop plants are being tentatively tried including Musk, Linseed, Jute, and *Urena lobata*. The last two are fibres. Jute does not appear suitable for our conditions but there would seem to be possibilities in *Urena* or Patwa fibre as it is called. Future results will be watched with interest. One of the main difficulties so far experienced with *Urena* is that it appears to seed sparsely when brought under cultivation from the relatively wild state in which it occurs. This would tend to make its extension problematical.

Agricultural Station, North West District.

58. In January, 1907, the then Combined Court approved of the establishment of an experimental station in the North West District for the cultivation of rubber and other products. Activities have been confined chiefly to rubber and balata, the returns from which in recent years have not justified the expense of tapping. In January, 1928, provision was made for the appointment of an Agricultural Superintendent for this District and \$5,000 voted for the extension of experiments in various permanent crops, especially citrus fruits and coffee, with any other introductions that may offer scope for development. Ground provisions were also to receive study owing to their importance in economics of permanent crop agriculture under conditions in the district. Considerable clearing, draining and other operations, preliminary to the establishment of the crops mentioned below, have been carried out.

59. *Coffee*.—This is the principal crop in the district, being specially adapted to the low-lying pegass soils. Preparations were in progress during the period under review for the planting of 10 acres of Liberian coffee, the commercial variety grown, with smaller areas of other hardy kinds such as Robusta, Excelsa, de Weeveri and Stenophylla. This block of Liberian will be sub-divided for observations to be made *inter alia* on the value of pruning *versus* non-pruning, while complete records are being kept of the cost of establishment and maintenance. The same agricultural system is being followed as that in the district of growing ground provisions on the land to form a temporary shade for the young coffee and to yield a cash return while waiting for the coffee crop to come in. Such temporary crops include principally bananas (Gros Michel collected in the district and Giant Fig imported from Trinidad), maize, cassava (different varieties), and yams.

Records are being kept of the returns from these crops. The acreage in coffee will be gradually extended.

60. *Citrus*.—A site for experiments with budded citrus trees was selected on the laterite hills and a start in planting was made in June, when two acres of budded citrus fruit trees obtained from Trinidad were planted out, comprising a number of the best commercial varieties of grapefruit and oranges.

61. In December this area was further increased by the planting of one acre of budded Marsh grapefruit propagated at the Botanic Gardens, Georgetown, while further operations were in hand for starting another four acres, mostly grapefruit, early in 1929. In addition, nurseries for growing sour orange stock for budding were laid out and seed sown; these will provide planting material for further developments if justified. Steps were also being taken to clear and extend the existing lime area. The Agricultural Superintendent reports that all new plantings are making satisfactory progress, although at the end of the year precautions had to be taken to minimise the effect of the drought which had set in.

62. *Avocadoes*.—About half an acre of budded avocado pears have been established and have made a good start. These include five named varieties received from Trinidad. The area will be increased as material is available.

63. *Pine-apples*.—A section is being devoted to experiments with this fruit. A number of varieties have been introduced, including 500 plants of the Red Spanish, a recognised commercial variety which stands transportation much better than ordinary local kinds.

64. *Plants possessing insecticidal properties*.—One acre was prepared for experiments in connection with Haiari (*Lonchocarpus* spp.) and other plants having pronounced insecticidal properties. A collection of such plants has been made and a number planted out. The objects in view are: first, to discover whether these forest plants can be satisfactorily cultivated, and, secondly, if so, whether they will retain their poisonous properties. Reference to the value of these plants as a possible source of insecticides was made in last year's report.

65. *Miscellaneous*.—The work at the Station also included minor experiments with onions, legumes for cover crops—these being essential for preventing erosion and soil wash where hill lands are brought under cultivation—and certain fodder grasses.

Pomeroon Sub-Station.

66. A small station has, for some years, been in existence at Marlborough Pomeroon, where the Agricultural Assistant for the district resides. It is largely used as a nursery and distributing centre for coffee and other economic plants in the Pomeroon.

AGRICULTURAL EDUCATION AND EXTENSION.

67. *District Instruction*.—During the year determined action was taken to bring the Department more in touch with agriculturists. While a fair measure of success was achieved, it was felt that the agricultural staff in the different counties will require to be considerably strengthened by trained men if efforts for agricultural development on a substantial scale are to be pushed. The agricultural stations form convenient centres from which this work can be organised, hence the most conspicuous successes during the year under review have been achieved in those counties possessing stations, namely, Demerara and the North West District. The Demerara Stations at Georgetown and Cecilia have had a heavy year in dealing with the demands made on them and also in rendering assistance to those counties, notably, Essequibo and Berbice, where there are no stations, but which it is hoped in time to supply.

68. A considerable number of farmers visited the Georgetown Station and the sub-Station Cecilia, where the work on rice at the former in particular and that on minor crops at the latter attracted much attention. Large numbers of the older school children on the East Coast were also taken to Cecilia under the guidance of the Agricultural Instructor.

69. Special mention must be made of the campaign to improve the quality and yields of rice in those districts suitable to its culture. In this work the staff of the Georgetown Station took a leading part. With the help of several prominent growers in Essequibo, Corentyne and the West Coast Demerara, demonstration nurseries were started and assistance also given by the Department in roguing seed plots and giving such help and advice as was possible for improving the cultivation. In this connection, assistance was also rendered in the Corentyne by Mr. Essex, Commissioner, who secured selected seed from the Department and supervised its distribution and cultivation. As a result, the Department has been unable to cope with the demand for selected seed, while the production of the cereal for the year constitutes a record for the Colony.

70. In order to stimulate the District Agricultural Instructors and to instruct them in the proper methods to be adopted, they were twice during the year brought to headquarters for short refresher courses. Thus, they were able to carry back information which they had gained first hand to the growers. In addition to the work on rice, a great deal of visiting has been done and advice given in connection with the usual routine agricultural practices. Frequent visits by the Director and headquarters' staff have helped to encourage these district activities. While progress has been made, it is felt that the Department's work in this direction is only in its initial stages and increased facilities will have to be provided if the ground gained is to be consolidated and fresh endeavour maintained.

71. *Apprentice Scheme.*—The scheme still exists for training a number of lads at headquarters. Improvements have been made during the year by providing greater variation in the type of work given and by introducing a course of simple talks on agricultural problems. It is hoped to still further improve this training to give the recipients more interest in their own plots, which it is hoped to be able to provide for them in the extension of the land at the Experiment Station which is contemplated. When the staff of the outside districts has been increased and other stations organised, it should be possible to extend this scheme.

72. *Exhibitions and Competitions.*—An Agricultural, Live Stock and Industrial Show was held at Friendship, East Coast, on October 23, by the Buxton and Friendship Farmers' Association, under the auspices of the Department. The Show was opened by His Excellency the Officer Administering the Government, the Hon. C. D. Douglas-Jones, C.M.G., and was an unqualified success. On the whole, the exhibits of fruits and vegetables were fairly satisfactory and the display of live stock was considered excellent. Opportunity was taken by the Department to stage an educational exhibit of seedling canes, rice, budded fruit plants and other economics, soya beans, fibres, etc. The officers of the Department attended and gave information relating to the various crops and products exhibited, including methods of controlling pests and diseases, illustrative material and literature being provided by the Entomological and Botanical Divisions.

73. For the first time, a Farmers' Competition was held in the North West District. Prizes were awarded to the value of \$120 for the following :—

1. The best acre of ground provisions.
2. The best two acres of young coffee.
3. The best two acres of established coffee.

74. A successful Farmers' Competition was also held at Victoria, East Coast, in December. Prizes were offered for cultivations of plantains, sweet potatoes and ground provisions generally. Awards totalling \$175 were made.

75. *Agricultural Associations*.—Eight associations received affiliation grants varying from \$10 to \$25 during the year.

ENTOMOLOGICAL INVESTIGATIONS.

76. *Sugar-cane*.—Investigations were continued on the rearing of parasites of the Small Moth Borers with the hope of facilitating and improving the present methods, and thereby increasing the efficiency of this phase of control. Investigations were also continued in connection with the damage and loss caused to this crop by these pests. Further observations were made on the Yellow Sugar-cane Aphis, *Sipha flava* Forbes, which it will be remembered was very prevalent during the previous year. No serious outbreak of the pest occurred during the year under review.

77. *Rice*.—No serious outbreak of any pest occurred during the year although a certain amount of damage was done in certain districts by the Army Worm, *Laphygma frugiperda* on seed beds. The Paddy Bug, *Mormidea pascilla* Dall. also received attention in districts where it appeared and growers were instructed how to cope with it.

78. *Coconuts*.—The investigations on the Coconut Stem Borer *Castnia daedalus* Cram., were in progress and it is hoped that a preliminary statement on this insect will be available during the coming year. Georgetown again suffered from a severe outbreak of Coconut Caterpillar, *Brassolis sophorae* L., and a large number of palms in the city were denuded. Through the neglect of the owners the outbreak which started in the Alberrtown District spread over almost the entire city. The Department instituted a campaign of cleaning of affected palms to serve as a demonstration to owners, by means of which a large number of palms in the thickly populated districts of Werk-en-Rust, Charlestown, Wortmanville, Albouystown and the Lodge escaped injury. The cost worked out at about 10 cents per palm. Although regular efforts have now been made to educate owners of coconuts in respect to the pest it is significant how little interest is shown by them. The Department will have no alternative in future but to take such legal action as the Plant Protection Ordinance provides.

79. *Other Crops*.—Several inquiries in respect to pests of vegetable and garden crops were dealt with. Fortunately there was no outbreak of "Cockles" *Ligyris ebenus* DeG., which is often destructive to ground provisions in the North West District.

80. *Silk Worm*.—Rearing trials were continued from eggs received through the Imperial Institute, London, but the results were on the whole unsatisfactory as even in the best hatchings only 10 per cent. of the eggs produced larvæ.

81. *Miscellaneous*.—The usual attention to the insect collection was given during the year whilst a certain amount of the Entomologist's time had to be given to plant imports and to tours and visits in connection with his work.

BOTANICAL AND MYCOLOGICAL INVESTIGATIONS.

82. As the Botanist only arrived in the Colony on October 17 there was little time left of the year under review for investigational work. Nevertheless the following received attention.

83. *Herbarium*.—The usual routine work of the Herbarium has been carried out. In connection with the co-operative effort of the Royal Botanic Gardens, Kew, and the New York Botanical Garden to produce a flora of British Guiana, a

considerable amount of material from the Herbarium has been lent to these two institutions. In addition a number of identifications of plants collected on recent expeditions have been received both from Kew and New York.

84. *Weed Eradication*.—Further experiments have been carried out to discover the best method of eradicating the weed *Antidesma Ghesaembilla*. Spraying with a 1% solution of Sodium Arsenite having been found to kill out the plant in a small area, after four applications, similar treatment is being tried over a larger area, in the Botanic Gardens, which was covered with an almost pure stand of *Antidesma*. The plants were cut back close to the ground, and the new shoots arising were sprayed when some six inches to one foot high. These being killed, further suckers arose, which were similarly treated. The spraying is still in progress, and a more detailed report will be given when the treatment is completed.

85. *Plant Diseases*.—A preliminary investigation has been made of the coffee disease, *Sclerotium cofficolum*, in the North West District and a campaign planned for thorough investigations of the economic methods of controlling this disease. The Botanist reports that whilst studying this disease he found evidences of a wilt disease which responded to improved drainage. Minor troubles affecting citrus and tobacco have been examined and dealt with.

LIVE STOCK.

86. The Government Veterinary Surgeon arrived in the Colony on September 19. He comments unfavourably on the lack of records in the division and of inadequate equipment for his work. During 1929 steps will be taken to meet the latter deficiency.

87. *Breeding stock*.—Reference was made in last year's report to the steady depletion which had taken place in the animals owned by the Department. This is being gradually remedied and at the end of December the numbers were: three pure bred Holstein Freisian Bulls, four Holstein Freisian Cows, three Jack Donkeys, three Large Black Pigs, one Shropshire Ram and two Ewes. The casualties during the year included one Jack Donkey, one Shorthorn Devon Bull, two Shropshire Rams, one Shropshire Ewe and one Large Black Sow. The additions included six working oxen.

88. *Stock Farm*.—The conditions at the Botanic Gardens being unsuitable for keeping breeding animals, about 32 acres of land adjoining D'Urban Park and the Experiment Station, Georgetown, have been allotted to the Department for use as a small stock farm. Much of this is being conditioned, drained and fenced while temporary accommodation is being provided for some of the animals. Two portable poultry houses have been built and plans are in hand for portable pig sties. Permanent buildings and paddocks will have to be constructed. A certain amount of forage has been grown, comprising Elephant Grass, Uba Cane, and Pigeon Peas. This will be extended next year along with other forage plants.

89. *Diseases*.—During the months of October and November outbreaks of Anthrax occurred in cattle at Plantations Ogle, Industry and Bel Air. There were five deaths and 1,613 in-contact animals were inoculated with Anthrax Vaccine. It is to be noted that the grazing areas of the affected plantations adjoin the public road and are unenclosed, thus making conditions easy for the spread of the infection. Lack of fences along the main roads is general in the Colony. There was one case of tuberculosis in pigs, but as the Government Veterinary Surgeon points out, in the absence of all records it is not possible to state whether tuberculosis is or is not a common disease of animals in the Colony. Further, the stock disease regulations require to be amended at an early date.

90. *General*.—In his remarks on the cattle of the Colony the Veterinary Surgeon refers to the fact that there has been no strict policy in the past as to the breed

of bull imported, first one kind and then another has been tried. Possibly too rapid results were expected and again the management of the progeny has not been all that was required. Much of the pasture land is overstocked and many of the animals can be of no possible use to their owners. Many breeders apparently prefer quantity to quality. The Department is now using Holstein Freisian Bulls entirely, and it is proposed to keep to this one breed which possesses many advantages. The more important ones are massive frame, crossing well with the large native stock and producing good utility animals for milk, beef or draft depending on the purpose for which they are selected. A problem of some magnitude is the improvement of local pastures.

91. Interest is being shown in swine husbandry and steps are being taken by the Department to renew breeding stock. Insufficient interest is taken in sheep and goats and little is known of the diseases from which sheep suffer in the Colony. A few breeders are interested in poultry and have imported good stock. Unfortunately, quality counts for little on the local market, and the same prices rule for eggs or chickens whether they are of poor or good breeds. There would seem to be opportunities, however, for those farmers who supply good clean milk and hogs, poultry and eggs of good quality.

92. The census of the livestock for the Colony in 1928 is given as under:—

Horses	...	...	...	3,702
Asses	...	...	...	7,789
Mules	...	...	...	1,846
Horned Cattle	...	...	...	154,174
Buffaloes	...	...	...	392
Sheep	...	...	...	25,937
Goats	...	...	...	15,772
Swine	...	...	...	24,248

BOTANIC GARDENS AND NURSERIES.

93. *Ornamental Section.*—The ornamental aspect of the Gardens was well maintained during the period under review. On the parapets of the beds and borders there was a continuous display of the various annuals suitable to local conditions. One of the special attractions in the early part of the season was a fine selection of newly imported Cannas received from the Royal Botanic Gardens, Kew, and the New York Botanical Gardens. The re-arrangement of the shrubs in the beds for mass effect has made some progress but is necessarily slow as the success depends on continuous showery weather for transplanting. In the course of the year 27,637 annuals, 378 shrubs and 16 climbers were planted out. The park lands, lawns and roads have been satisfactorily maintained and there is an increasing area of lawn on which a mowing machine can be used. The general condition of the Gardens shows a marked improvement to the previous year as the result of the clearing and pruning to which they were subjected towards the end of 1927. Government House and other gardens and grounds have been supervised as usual by the Assistant Superintendent.

94. *Nurseries.*—It is satisfactory to record that the difficulties which were experienced in past years with the propagation of economic plants by budding have been successfully overcome and this work has been actively pursued especially in respect to citrus during the year. In consequence, sale of seedlings of citrus plants has been discontinued and in future only reliable and known kinds will be offered for sale. Much of the success so far achieved is due to the result of a visit undertaken by the Assistant Superintendent to Trinidad, where, through the courtesy of the Director of Agriculture, he spent three weeks in studying the methods employed there. This work is now being pushed forward as rapidly as circumstances permit. Unfortunately, as far as citrus is concerned, there is no budwood which can be

obtained locally, and we are depending mainly upon Trinidad which is also engaged in developing a citrus industry and therefore requiring large stocks of budwood. So far the majority of the plants propagated at the Botanic Gardens have been utilised for starting citrus experiments in the North West.

95. During the year, there was a great demand for coffee plants and various fruit plants, and large orders have been received for 1929 delivery. The total number of seeds and plants handled and cared for in the nurseries during the year amounts to 65,923.

SEED AND PLANT DISTRIBUTION.

96. The following list shows the actual quantity of planting material distributed by the Department during the year:—

Field and Garden Crops.

Sugar cane	...	...	2,450 cuttings
Rice padi	...	...	68,250 lbs*
Ground-nuts	...	...	392 lbs
Bengal beans	...	...	102 „
Soya beans...	...	...	216 „
Onions	...	...	36 „
Tobacco	...	...	1 „
Tomatoes	...	...	10½ oz.
Cabbage	...	...	12½ „

Orchard Crops.

Liberian coffee	...	...	3,187 plants
Cacao	...	...	340 „
Nutmeg	...	...	130 „
Budded citrus	...	...	100 „
Miscellaneous fruits	...	...	938 „

SEED AND PLANT EXCHANGE.

97. During the year a number of valuable introductions were made, including material of both economic and ornamental plants. Complete details showing kinds, quantities and places of origin have appeared regularly in the *Agricultural Journal* under plant and seed importations. Contributions from the Botanic Gardens have been sent to Kew, Roumania, Germany, East Africa, Burma, Ceylon, Australia, Brazil, Barbados and Trinidad.

PUBLICATIONS.

98. A new Journal styled "The *Agricultural Journal of British Guiana*" is being published and takes the place of its predecessor which was known as "The *Journal of the Board of Agriculture*." The *Agricultural Journal* is issued quarterly and has a circulation of approximately 1,000. Space is given to scientific articles dealing with original investigations while the more popular contributions are reprinted in leaflet form for free distribution. Those which have appeared in this way during 1928 are: "A.B.C. of Rice Culture," "The Paddy Bug," "Onion Culture," "Hints to Exhibitors." Progress reports of departmental activities, illustrated, also form one of the features of the new Journal, the price of which is two shillings per annum.

99. In addition to the staff contributions which have appeared in the Journal, a paper by the Entomologist entitled "A method for the rearing of egg parasites of the sugar-cane moth-borers" was published in the *Bulletin of Entomological Research*, Volume XIX. Part 1. A paper by the same author entitled "Sugar-cane insects in British Guiana" was also prepared for presentation at the Fourth Entomological Congress at Cornell University, U.S.A., in July, 1928,

* Includes 28,130 lbs. selected in Essequibo.

GENERAL REMARKS.

100. From a careful study of the preceding it will be seen that an attack has been made on a wide front and on practically all crops with the exception of coconut. For this, another station is necessary. It is hoped to establish this in Berbice on a sufficiently large area and under conditions suitable for the study of the agronomic problems relating to the crop.

101. The rice situation demands that immediate action be taken to secure an adequate supply of pure seed for the needs of the whole Colony. This will be met by the establishment of a station and seed farm in the Essequibo District during 1929.

102. Peasant agriculture in the Colony is much in need of efficient co-operative organisation for assisting to finance production and for the preparation and disposal of the produce. Thus, early developments in the realm of agricultural economics are definitely envisaged. The Deputy Director will devote much of his time to this branch of the Department's work.

103. In other directions, the following requirements are foreshadowed, some of which require immediate consideration :—

(1) *Buildings*.—Plans have been completed for proper office and laboratory accommodation and estimates are being prepared by the Public Works Department.

(2) *Staff: Agricultural*.—Two additional Agricultural Superintendents for county work. *Chemical*.—Research officer for Agricultural Chemistry, especially soil investigations. *Botanical*.—Separation of Botany from Mycology creating two divisions in place of the existing one and making adequate provision under Botany for plant breeding work. It is impossible for one officer to deal satisfactorily with both Botany and Mycology. *Entomological*.—Assistant officer for this Division. *Veterinary*.—Assistant officer for the Livestock Division.

104. It should not be out of place at this point—directly concerned as the Department is in the prosecution of an active policy designed to increase the production of the country—if attention were called to two important directions in which early action seems imperative if this increased production is to be secured :—

(1) Better organisation and control of drainage and irrigation ;

(2) Improving the present uneconomic distribution of the Colony's agricultural population.

105. In connexion with the first, reference may be made to the following statements which appeared in the writer's memorandum (para. 5) outlining the plans and policies of the Department. (C.S.O. 4952/27) :

“ I believe that if the future is to be faced with any degree of confidence on these low lands the drainage question (agriculturally) must receive careful study and investigation without delay The whole country's prosperity and progress—large and small cultivator alike—depend on efficient drainage added to which is the economic use and development for agricultural purposes of the country's water supply.”

106. Undoubtedly, the grave risks from droughts and floods and the losses to which farmers are periodically subjected serve in a great measure to discourage the youth of the country from taking up agricultural enterprise and is a hindrance to the expansion of peasant farming.

107. With regard to the second problem—that of securing more economic distribution of the agricultural population—it is estimated that the average number of

acres per family is barely one, excluding the proprietors of large pasturage estates in the Colony; whereas, on the other hand, a family can easily work three acres without employing labour. This is a matter which could be greatly facilitated by the administrative officers in co-operation with the local authorities and the agricultural officers.

108. A remarkable feature of the year under review and which should be noticed here was the large number of visitors from outside the Colony who displayed more than passing interest in the work of the Department, not the least of which was the very welcome visit of the Principal, staff and students of the Imperial College of Tropical Agriculture during the Easter vacation.

109. Finally, I cannot conclude this report without expressing my thanks for the courtesy and help which has been rendered the Department by sugar planters and others, notably Mr. H. T. King, Commissioner of the North West District. I desire also to record my appreciation of the energetic manner in which the staff has co-operated in what has been an interesting though extraordinarily heavy year's work.

J. SYDNEY DASH,
Director.

May 10, 1929.

